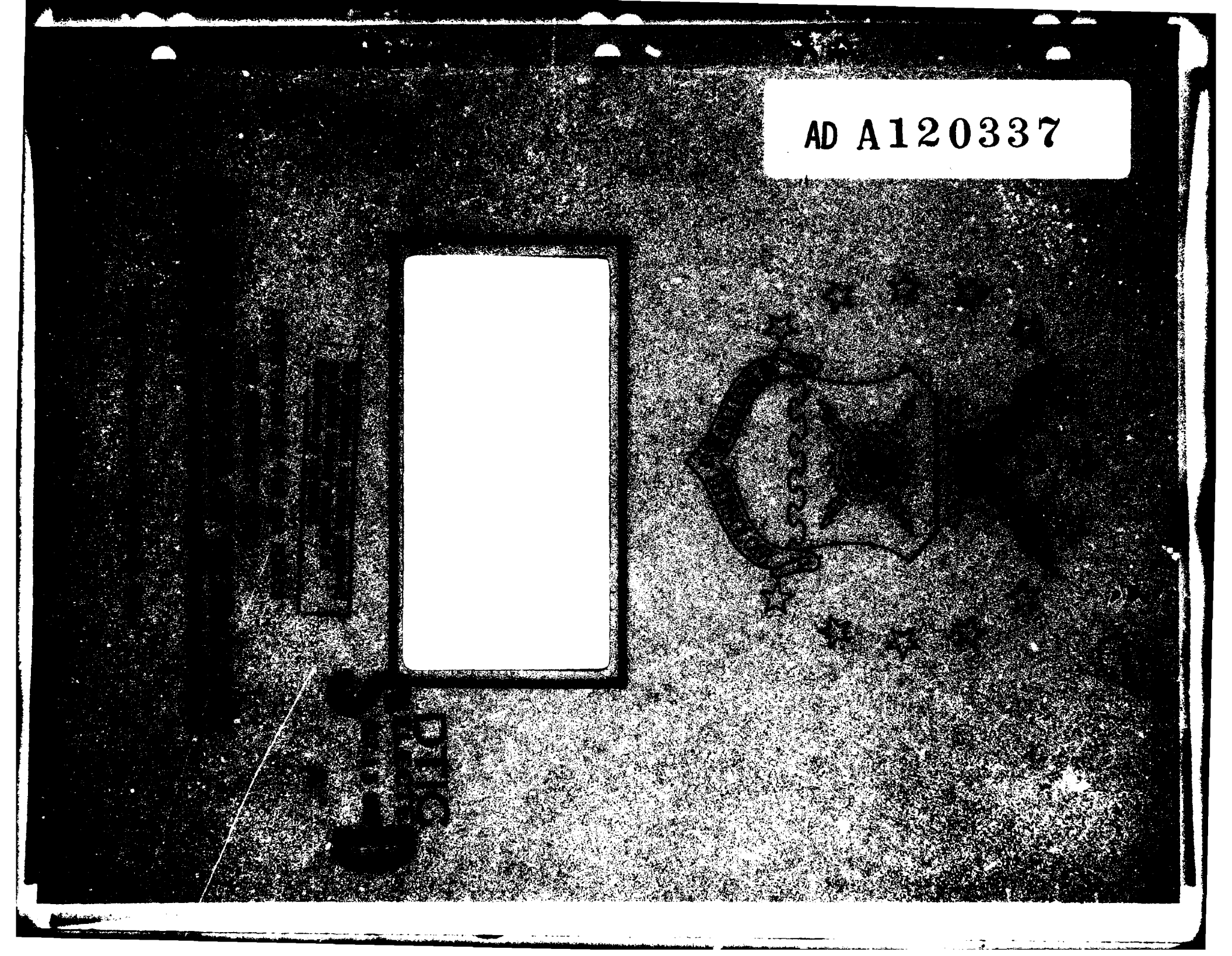
AD-A120 337 AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL--ETC F/G 5/10
STRESS ASSESSMENT: EVALUATING FACTORS INFLUENCING ORGANIZATIONA--ETC(U)
AUG 82 N K OVALLE, W H HENDRIX
UNCLASSIFIED AU-AFIT-LS-1-82 NL

END
DATE FILMED
11-82
DTIC



STRESS ASSESSMENT: EVALUATING FACTORS INFLUENCING ORGANIZATIONAL EFFECTIVENESS AND INDIVIDUAL HEALTH

Nestor K. Ovalle, 2d, Major, USAF
William H. Hendrix, Lt Col, USAF

AU-AFIT-LS-1-82

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER AU-AFIT-LS-1-82	2. GOVT ACCESSION NO. AD-A120 337	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) STRESS ASSESSMENT: EVALUATING FACTORS INFLUENCING ORGANIZATIONAL EFFECTIVENESS AND INDIVIDUAL HEALTH		5. TYPE OF REPORT & PERIOD COVERED 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Nestor K. Ovalle, 2d, Major, USAF William H. Hendrix, Lt Col, USAF		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS School of Systems and Logistics Air Force Institute of Technology, WPAFB OH		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Department of Communication and Humanities AFIT/LSH, WPAFB OH 45433		12. REPORT DATE August 1982 13. NUMBER OF PAGES 9
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited		30 AUG 1982
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Stress Assessment Stress and Health Stress and Effectiveness		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)		

FREDRIC C. LYNCH, Major, USAF
Director of Public Affairs

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Research was conducted to evaluate the Stress Assessment Package, an attitudinal survey measuring a number of organizational and personality variables which have been described in the literature as being associated with stress. The Stress Assessment Package was developed as part of a long-term stress research program which seeks to evaluate the relationship between stress, organizational and individual factors, and, physiological and psychological outcomes. Data were collected on 411 military and civilian personnel located at three Air Force bases and one civilian hospital using the Stress Assessment Package and measuring (from blood samples) levels of cholesterol, HDL cholesterol and cortisol. Factor analysis was performed on the attitudinal variables, followed by an analysis of the reliability of each of the derived factors. Fifteen independent factors were delineated, with satisfactory estimates of internal consistency. The factors include both organizational and individual (personality) factors which can be used in large-scale stress research programs.

AU-AFIT-LS-1-82

STRESS ASSESSMENT: EVALUATING FACTORS INFLUENCING ORGANIZATIONAL EFFECTIVENESS AND INDIVIDUAL HEALTH

A School of Systems and Logistics AU-AFIT-LS Technical Report

Air University

Air Force Institute of Technology

Wright-Patterson AFB, Ohio

By

Nestor K. Ovalle, 2d
Major, USAF

William H. Hendrix
Lieutenant Colonel, USAF

August 1982

Approved for public release;
distribution unlimited

TABLE OF CONTENTS

Stress Assessment: Evaluating Factors Influencing Organizational Effectiveness and Individual Health

Introduction

Stress, its causes and effects, has become a topic of increasing interest to organizations (managers and employees) and to researchers (behavioral and medical scientists). The reason for the attention being given to this topic is straightforward; there is increasing evidence that stress can have severe effects on individual health and performance and thereby, on organizational effectiveness. These effects can be both short term and long term. In the short term, if an individual is subjected to increasing amounts of stress, a point will be reached where performance decreases as the stress level increases. Over a long term, continual exposure to stress will further degrade individual performance, have a negative influence on the individual's ability to cope and deal with stress, and, if severe enough, may precipitate serious psychological and physiological problems. From just a physiological perspective, the problems of ulcers, high blood pressure, allergies, and coronary heart disease are believed to be, in part, precipitated by stress.

From the perspective of the Industrial/Organizational Psychology literature, a number of researchers have looked at the area of stress by focusing on such organizational variables as role conflict, role overload and role ambiguity in terms of their relationship with various organizational outcome variables, e.g., job performance and job satisfaction (Ivancevich and Matteson, 1980).

Within the field of medical science, a number of research efforts have investigated the relationship between stress and various physiological outcomes (e.g., coronary heart disease potential). Several physiological measures have been repeatedly evaluated in this area, i.e., levels of cortisol, high density lipoprotein (HDL) cholesterol and cholesterol.

Cortisol is an adrenal hormone which is secreted into the blood stream. A series of studies (Brown, Schalch, and Reichlin, 1971; Kopin, 1976; Rubin, Rache, Clark, and Arthur, 1970) have indicated that as stress increases there is a resulting increase in the blood cortisol level. In addition, there is some evidence that increased cortisol levels result in increased total cholesterol levels. This relationship suggests that stress may be a factor in the development of coronary heart disease.

Various physiological changes occur when one is exposed to a stressful environment. Two blood components affected by stress are cholesterol and cortisol (an adrenal hormone). Friedman and Carroll (1957) examined tax accountants to determine the effects that heavy work load, high level of responsibility, time pressure, conflict, and job-role ambiguity had on cholesterol level. Their results indicated that there was a marked increase in the blood cholesterol level as the tax-filing deadline approached. After the deadline passed, the cholesterol decreased; returning to normal within two months.

HDL cholesterol, on the other hand, has been indicated as a coronary heart disease reducing factor (Kritchevsky, Paoletti, and Holmes, 1978). That is, as

HDL cholesterol increases, there is a decreasing probability of developing coronary heart disease.

Notwithstanding the laudible research efforts on stress in both the behavioral and medical science areas, there is a need for integrative efforts, investigating the relationships (causes, outcomes, etc.) between organizational/psychological variables, physiological dimensions and stress. In other words, stress research must be performed to incorporate the concerns and knowledge of the physiological and psychological sciences.

Problem

A long-term stress research program is being conducted by members of the Air Force Institute of Technology and the USAF School of Aerospace Medicine. The program includes the development of a Stress Assessment Package, designed to measure a variety of organizational, personality and background/personal history factors (which have been theoretically associated with stress and coronary heart disease) and perceived stress. In addition, this stress program includes the measurement of various physiological measures of stress (i.e., cortisol) and coronary heart disease potential, e.g., total cholesterol HDL cholesterol. This paper focuses on the methodology used to develop the Stress Assessment Package and to collect the physiological measures.

Method

Subjects

A sample of 411 individuals completed the Stress Assessment Package. With the exception of approximately 40 employees of a civilian hospital, all individuals were Air Force civilian and military employees at either Eglin Air Force Base, Kelly Air Force Base or Wright-Patterson Air Force Base.

Approximately 85% were males and 15% were females. Participation was on a voluntary basis and anonymity was insured by each subject selecting a number which served as their personal identifier known only to them.

Procedure

The Stress Assessment Package was developed to measure a variety of organizational/behavioral variables and personality variables which have been identified as being potentially associated with stress (e.g., role conflict, organizational climate, job enrichment, Type A Behavior and locus of control). In addition, this instrument measures perceived stress and includes a variety of background information questions and personal history items (e.g., smoking habits and physical exercise behavior). Table 1 provides a summarized description of the organizational and personality variables, and the major background/personal history items included in the instrument.

The instrument consisted of 139 items of which 110 were primarily 7-point Likert-type attitudinal items and 29 were background information items. Many of the items were taken from the Organizational Assessment Package (Hendrix and Halverson, 1979), others were developed explicitly for this stress program.

The Stress Assessment Package was administered to volunteers en masse at each administration site. After completing the survey, the researchers assisted the respondents in computing their indices on several of the factors (e.g., locus of control, job enrichment, and Type A behavior). An explanation

TABLE 1
Description of Variables Included in Stress Assessment Package

ORGANIZATIONAL VARIABLES

1. General Organizational Climate
2. Role Ambiguity
3. Role Conflict
4. Policies and Regulations
5. Organizational Communications Climate
6. Productivity
7. Job Related Satisfaction
8. Job Enhancement
9. Autonomy
10. Planning and Time Management
11. Goals
12. Advancement/Recognition
13. Meaningful/Responsible Work
14. Management/Supervision
15. Supervisor Asst./Feedback
16. Work load/Time Pressure
17. Responsibility for People
18. Co-worker Relations
19. Change in Work Responsibilities
20. Equipment limitations
21. Communication Between Co-workers
22. Goal Participation
23. Career Employment Intentions
24. Person/Role Congruence

PERSONALITY VARIABLES

1. Locus of Control
2. Type A/Type B
3. Assertiveness

BACKGROUND INFORMATION AND PERSONAL HISTORY

1. Life Events
2. Exercise
3. Medication Usage
4. Smoking Habits
5. Rank (officer, enlisted, GS, WG, Non-DOD)
6. Race
7. Sex
8. Weight/Height
9. Age
10. Education
11. Professional Military Education
12. Does Supervisor Write Performance Report
13. Number of Co-workers
14. Work Schedule
15. Number of People Supervised
16. Job Tenure

of these factors was provided in order to give the respondents some immediate feedback and consultation. The attitudinal items of the Stress Assessment Package (i.e., the organizational and personality variables) were factor analyzed. The results of this analysis are discussed in the succeeding section of this paper.

Certain physiological factors were also assessed. Individuals desiring to learn of their levels of cholesterol, HDL cholesterol, and cortisol had their blood drawn. Almost all individuals completing the survey had their blood drawn (approximately 97%). The blood samples were analyzed by the USAF School of Aerospace Medicine, Brooks Air Force Base, Texas. Blood plasma was analyzed for total cholesterol, HDL cholesterol (both used as indicators of potential for coronary heart disease) and cortisol (a physiological indicator of stress). Presently, these data are being analyzed to evaluate the relationships between organizational and personality variables, coronary heart disease and stress.

Results and Conclusion

The major issue under evaluation in this paper is: what patterns (factors) can be detected among the attitudinal variables and to what degree are the items within each factor internally consistent or reliable. This issue was investigated by performing a factor analysis on the attitudinal variables and by evaluating the coefficient alpha (Cronbach, 1951) for each of the derived factors (or scales). The results are provided in Table 2.

TABLE 2

Orthogonal Rotated Factor Solution

FACTOR NO.	FACTOR LABEL	RANGE OF FACTOR LOADINGS	NO. OF ITEMS LOADING	COEFFICIENT ALPHA
1	Job Enhancement/Satisfaction	.44--.85	12	.93
2	Supervision	.65--.79	9	.92
3	Assertiveness	.47--.80	7	.82
4	Perceived Productivity	.80--.87	4	.91
5	Role Conflict	.47--.83	4	.79
6	Internal/External Locus of Control	.37--.61	8	.75
7	Organizational Climate	.56--.77	3	.85
8	Type A/Type B Behavior Pattern	.36--.66	7	.73
9	Need for Enrichment	.66--.78	3	.81
10	Role Clarity	.47--.50	2	.85
11	Job Autonomy	.79--.84	2	.91
12	Use of Time for Planning	.48--.97	3	.73
13	Time Adequacy for Work	.34--.64	3	.66
14	Intergroup Conflict	.63--.70	2	.72
15	Intragroup Conflict	.47--.54	2	.58

The factor analysis resulted in the identification of 15 independent factors. The factor labels (or names) depicted in Table 2 were derived by evaluating the highest loading items within each factor. As can be seen in Table 2, the factor loadings for each of the factors are all strong. In addition, the majority of the reliability coefficients (Cronbach Alpha) are satisfactory, ranging from .58 to .93 across all factors.

This analysis provides the initial phase of the development of the Stress Assessment Package to be used in our stress research program. Based on these results, the researchers have determined that the initial package requires some refinement. Specifically, several of the scales will be enhanced by the addition of more items, to be followed by further analysis/validation. These scales include Type A Behavior and Locus of Control. Furthermore, we have decided to supplement the Stress Assessment Package with several new additions, including measures of change in life events, measures of dietary fat, more extensive measures of physical exercise habits and more extensive measures of perceived stress. These will all be subjected to further analysis.

The long-range goal of this research program is to provide a valid/reliable Stress Assessment Package which can be used to investigate the critical issues described earlier, i.e., the evaluation of the effects of various organizational and individual variables on the individual (psychological and physiological) and, in turn, on the effectiveness of organizations. The Stress Assessment Package in conjunction with the assessment of various physiological measures provides a viable approach toward integrating the concerns of the behavioral and medical sciences in the investigation of a most crucial topic: stress.

References

Brown, G. M., Schalch, D. S., & Reichlin, S. Patterns of growth hormone and cortisol responses to psychological stress in the squirrel monkey. Endocrinology, 1971, 88, 956-963.

Cronbach, L. J. Coefficient alpha and the internal structure of tests. Psychometrika, 1951, 16, 297-334.

Friedman, M. and Carroll, V. Changes in the serum cholesterol and blood clotting time of men subject of cyclic variation of occupational stress. Circulation, 1957, 17, 852-861.

Hendrix, W. H. and Halverson V. B. Organizational Survey Assessment Package for Air Force Organizations, AFHRL-TR-78-93. Brooks AFB TX: Occupation and Manpower Research Division, Air Force Human Resources Laboratory, February 1979.

Ivancevich, J. M. and Matteson, M. T. Stress and Work: A Managerial Perspective. Glenview IL: Scott, Foresman and Co., 1980.

Kopin, I. J. Catecholamines, adrenal hormones, and stress. Hospital Practice, March 1976, 49-55.

Kritchevsky, D., Paoletti, R. & Holms, W. Drugs, lipid metabolism, and atherosclerosis, New York: Plenum Press, 1978.

Rubin, R. T., Rache, R. H., Clark, B. R., & Arthur, R. J. Serum uric acid, cholesterol, and cortisol levels: Interrelationship in normal men under stress. Archives of Internal Medicine, 1970, 125, 815-819.


ND
DATE
ILMED